

Work Order ID 78023

December-23-11 10:04:46 AM

78023

Page 1

Item ID: D212-664-101

Accept

N900040100

Setup Start

NS1

Revision ID:

Item Name: Crosstube Fwd

Stop

NS2

Start Date: 23/12/2011 **Start Qty:** 1.00 ***1***

Cust Item ID:

Required Date: 17/01/2012 **Req'd Qty:** 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: MLJ

Date: 11/12/11 Tooling: _____ Date: _____

Run Start

NR1

QC: _____

Date: _____ SPC (Y/N): _____ Date: _____

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--	----------------------------------	------------------------------	----------------	---------------	----------------------	-----------------------	-----------------------	--------------------------	------------------------

Draw Nbr	Revision Nbr
D212-664-141	Rev D (DEO)

100 *100*

DOCUMENT CONTROL

b

0.00

JJ for MLJ 12-1-11

DC Document Control

Memo

0.00

Photocopy bluefile and create labels as per PPP D212-664-101 CHG005

S-12/11

110 *110*

Pick Kit

0.00

MO

Packaging

Packaging

Memo

0.00

11-12-28

120 *120*

BENDING MACHINE - CROSSTUBES

0.00

TW
TR

CNC Bend 2

CNC Alpha 160 Bender

Memo

0.00

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio D212-664-101

11-12-28

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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1

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Required Date: 17/01/2012 Req'd Qty: 1.00

1

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Reference:

Approvals: Process Plan:

Date: Tooling:

Date:

Run Start

NR1

QC:

Date: SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00

Su12/28

130

QC

Quality Control

140

Crosstubes

0.00

140

Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549,using drill table DT8577, set-up towers in hole #7 as per QSI 10

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

MO
TW

11-12-28

JW

11-12-29

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

**Sequence ID/
Work Center ID**

**Operation
Description**

**Set Up/
Run Hours**

Tool ID

Tool #

**Plan
Code**

**Accept
Qty**

**Reject
Qty**

**Reject
Number**

**Insp.
Stamp**

150

Crosstubes Chemical Conversion

0.00

150

HandFXtube

Memo

0.00

JW

11-12-29

Hand Finishing Crosstubes

Chemical Conversion Coat within 24 hours of bending and drilling

160

QC5- Inspect part completeness to step on W/O

0.00

8/11/12/28

160

QC

Quality Control

170

Outsource process - NDT per QSI038 4.1

0.00

170

Outsource2

Outsource process - NDT

Memo

0.00

Liquid Penetrant Inspection as per QSI 038
Issue P/O: 1507
LPI as per ASTM 1417 Level 2
Attach copy of NDT results to work order

11-02-29

W/O:		WORK ORDER CHANGES							
DATE	STEP	PROCEDURE CHANGE			By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Reference:

Approvals: Process Plan: _____

Date: _____ Tooling: _____

Date: _____

Run Start

NR1

QC: _____

Date: _____ SPC (Y/N): _____

Date: _____

Stop

NR2

**Sequence ID/
Work Center ID**

**Operation
Description**

**Set Up/
Run Hours**

Tool ID

Tool #

**Plan
Code**

**Accept
Qty**

**Reject
Qty**

**Reject
Number**

**Insp.
Stamp**

180

180

Packaging

Receive & Inspect for Damage & Mat'l Certs

0.00

Packaging

Memo

0.00

Packaging

Ensure copy of NDT results attached to work order.

11/12/29

190

QC5- Inspect part completeness to step on W/O

0.00

190

QC

Quality Control

Memo

0.00

Inspect for damage & ensure results are as per Dwg D212-664-141

11/12/29

W/O:		WORK ORDER CHANGES							
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Reference:

Approvals: **Process Plan:** _____

Date: _____

Tooling: _____

Date: _____

Run Start

NR1

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

NR2

**Sequence ID/
Work Center ID**

**Operation
Description**

**Set Up/
Run Hours**

Tool ID

Tool #

**Plan
Code**

**Accept
Qty**

**Reject
Qty**

**Reject
Number**

**Insp.
Stamp**

200

200

SprayPaint

Spray Painting per QSI005 4.2

0.00

SprayPaint

Memo

0.00

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube as per DEO D212-667-141 with White Imron as per
QSI 005 4.2

PRIME:

Start Time: 7:30

Finish Time: 9:30

1/1/AS

12-01-02

PAINT:

Start Time: 7:15

Finish Time: 9:30

1/1/AS

12-01-03

210

QC14- Inspect Spray Paint

0.00

210

QC

Quality Control

Memo

0.00

Then, Wrap in plastic bag to protect from scratches

D R 12-01-04

W/O:		WORK ORDER CHANGES							
DATE	STEP	PROCEDURE CHANGE			By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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NS2

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1

Cust Item ID:

Required Date: 17/01/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

220

220

Crosstubes

Crosstubes

0.00

Memo

0.00

Crosstubes

1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper,
clean the area with 4105S wash 'n' wipe

2-Install supports with Proseal 890 per DS19563 and QSI 015
A/R Proseal 890 Batch: 119396

AS 12-01-10

3- Torque bolts as per dwg

230

QC6- Inspect dimensions to drawing

0.00

Sizlouli

230

QC

Quality Control

Memo

0.00

240

240

Packaging

Pick Kit

0.00

Memo

0.00

12/11/11

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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78023

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Item ID: D212-664-101

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N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Fwd

Stop

NS2

Start Date: 23/12/2011 Start Qty: 1.00

1

Cust Item ID:

Required Date: 17/01/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

250

QC4- 100% Inspect kits for completeness

0.00

250

QC

Quality Control

8/17/01/11

-Q

260

Packaging

0.00

103

260

Packaging

Packaging

Memo

0.00

H

12/1/11 SP

270

QC21- Final Inspection - Work Order Release

0.00

270

QC

Quality Control

Memo

0.00

12/1/12 JJ

MF
12-01-11

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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NOTE: Date & initial all entries

Picklist Print

December-23-11 10:04:50 AM

Page 1

Work Order ID: 78023

78023
D212-664-101

Parent Item: D212-664-101

Parent Item Name: Crosstube Fwd

Start Date: 23/12/2011

Required Date: 17/01/2012

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:E04.02.16ReformatKJ/DS

IPP Rev:F 06-03-29 Remove Coments on Pick List JLM

IPP Rev:G 07-04-30 As per Rev C JLM IPP Rev:H
11.04.26 inspection strip ecn 11-549 EC verified by:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-101TRN		Manufactured	No			110	Each	2.0000	1	1			**

D212-664-101TRN

Crosstube Turning Detail

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG	2	
77416	1	
77418	1	

D3595-063-450

Manufactured No

D3595-063-450

RUBBER CUSHION

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
MAT052	74.109474	
67353	2	
68893	6	
70113	0.56	
71354	0.2	
74113	0.349474	
75597	65	

MO 11-12-28

** 4.210526

1A 12-01-10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Picklist Print

December-23-11 10:04:50 AM

Page 2

Work Order ID: 78023

78023

Parent Item: D212-664-101

D212-664-101

Parent Item Name: Crosstube Fwd

Start Date: 23/12/2011

Required Date: 17/01/2012

Start Qty: 1.00

Required Qty: 1.00

MS21920-25

Purchased No

220

Each

76.0000

4

4

**

(4)

1A8 12-01-10

MS21920-25

Clamp(per MIL-DTL-8783C)

* 12005 2

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG050	76	
116264	2	
117998	4	
118142	4	
119339	2	
119746	14	
120054	50	

D2893-1

Manufactured No

220

Each

5.0000

2

2

**

(2) 1A8 12-01-10

* 77606

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG052	5	
72865	2	
76250	1	
76928	2	

D3428-1

Manufactured No

240

Each

17.0000

1

**

1 1A8 12-01-10

D3428-1

Placard

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST053	17	
76508	17	

AN6-35A

Purchased No

240

Each

28.0000

4

**

1 4 1A8 12-01-10

AN6-35A

BOLT

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST342	28	
119749	28	

X

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
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Work Order ID: 78023

78023
D212-664-101

Parent Item: D212-664-101

Parent Item Name: Crosstube Fwd

Start Date: 23/12/2011

Required Date: 17/01/2012

Start Qty: 1.00

Required Qty: 1.00

AN6-36A

Purchased

No

240

Each

40.0000

4

**

f

AN6-36A

Bolt

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST342	40	
118422	2	
119449	1	
119749	37	

MS21042L6

Purchased

No

240

Each

1,236.000

6

**

Y
b
f

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST300	1236	
117677	25	
118384	5	
118927	48	
118968	108	
119075	1000	
119736	50	

AN960JD616

NAS1149D0663J Purchased

No

240

Each

0.0000

18

**

4
18
m19075

AN960.JD616

Washer

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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DART AEROSPACE LTD	Work Order:	78023
Description: Crosstube High Fwd (205/212/412)	Part Number:	D212-664-101
Inspection Dwg: D212-664-141	Rev: D	Page 1 of 1

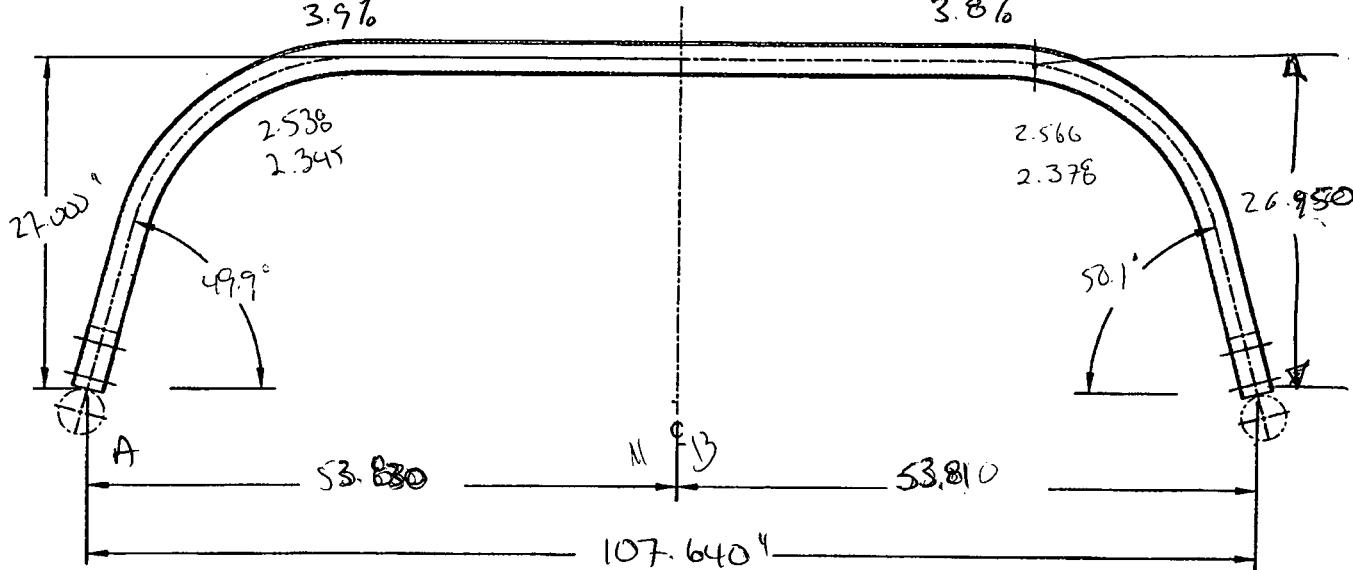
Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7

0.193 ± 4.883

3.9%

0.188 ± 4.944

3.8%



Comments
Sine A = 3.9% crushing @ 11 passes
Sine B = 3.8% crushing @ 13 passes

QC15 Inspection	<input checked="" type="checkbox"/>
Date	11/2/78

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM	
C	10.04.01	Dwg Rev updated	KJ	J

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8 7 6 5 4 3 2 1

D

D

Item	Qty -141	Qty -141B	Part Number	Description
1	X		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 126.514±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS
- 7) WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
CONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER

NO. 78023 M.L.S
11112123

REMOVED FROM UNDER REVIEW PER
UNDER REVIEW ECR#11-614
OF 11/12/13 11/07/26
FOR PMI SEALING SUPPORT

DEO ATTACHED

RELEASED
2009-10-29
MM

D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, C8-3 & B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>PH</i>	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>PP</i>	DRAWING NO.	REV. D
MFG. APPR.	<i>DS</i>	D212-664-141	SHEET 1 OF 4
APPROVED	<i>MM</i>	TITLE	SCALE
DE APPR.	<i>MM</i>	XTUBE ASSY (205/212/412 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY OTHER PURPOSE THAN THAT FOR WHICH IT WAS PROVIDED OR OTHERWISE DISCLOSED TO OTHER PERSONS WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD	

8 7 6 5 4 3 2 1

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

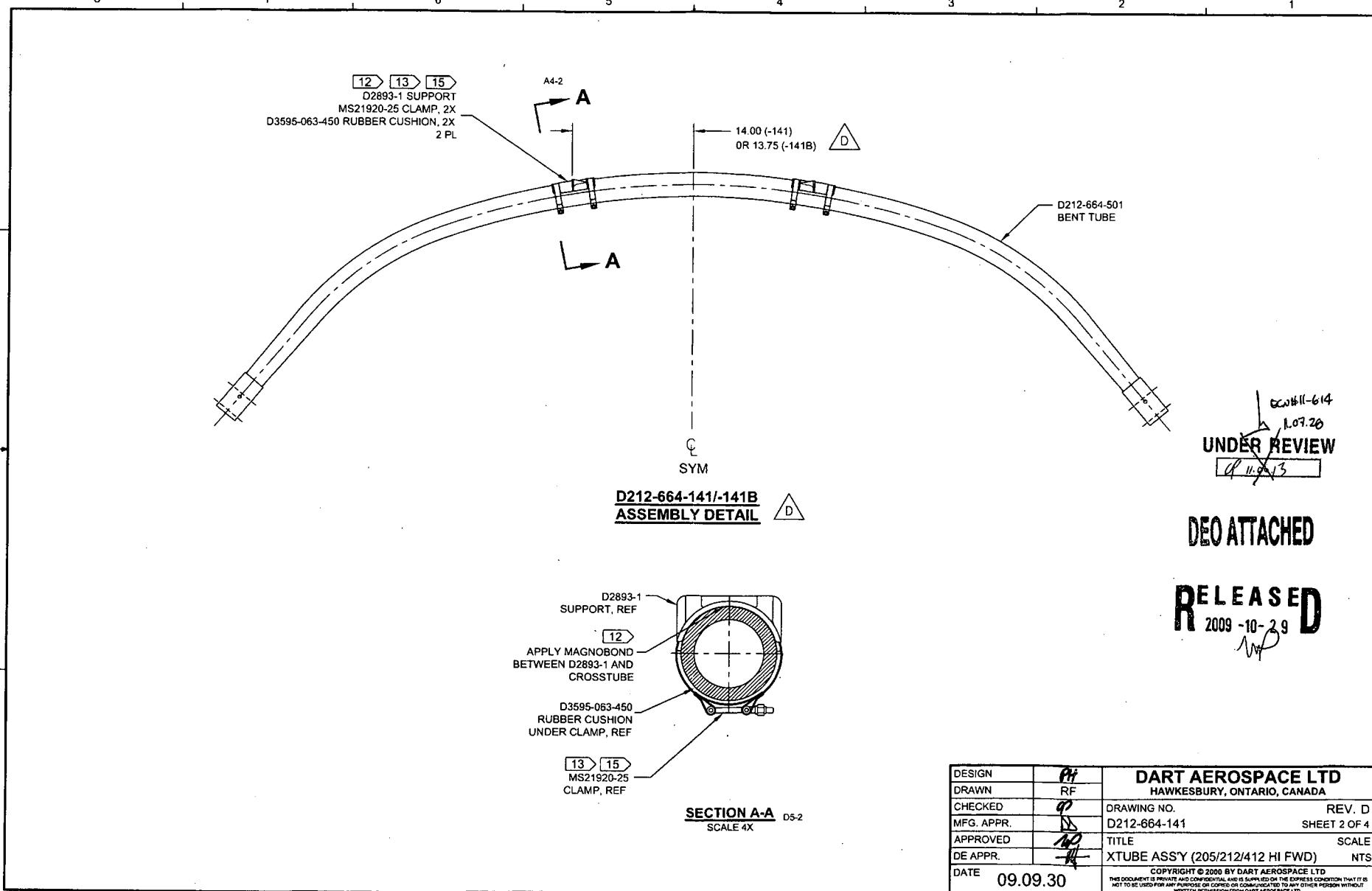
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

78023



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

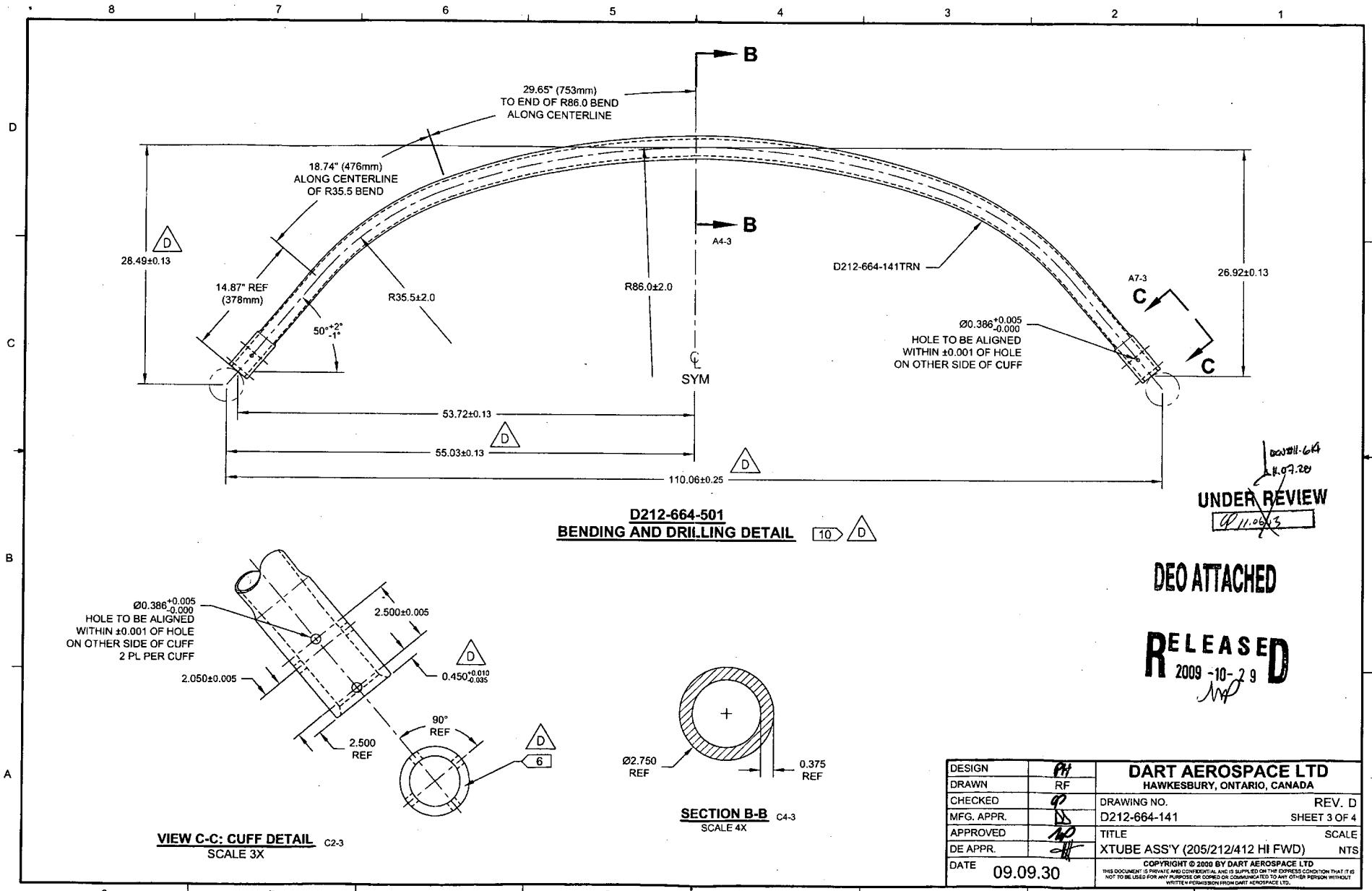
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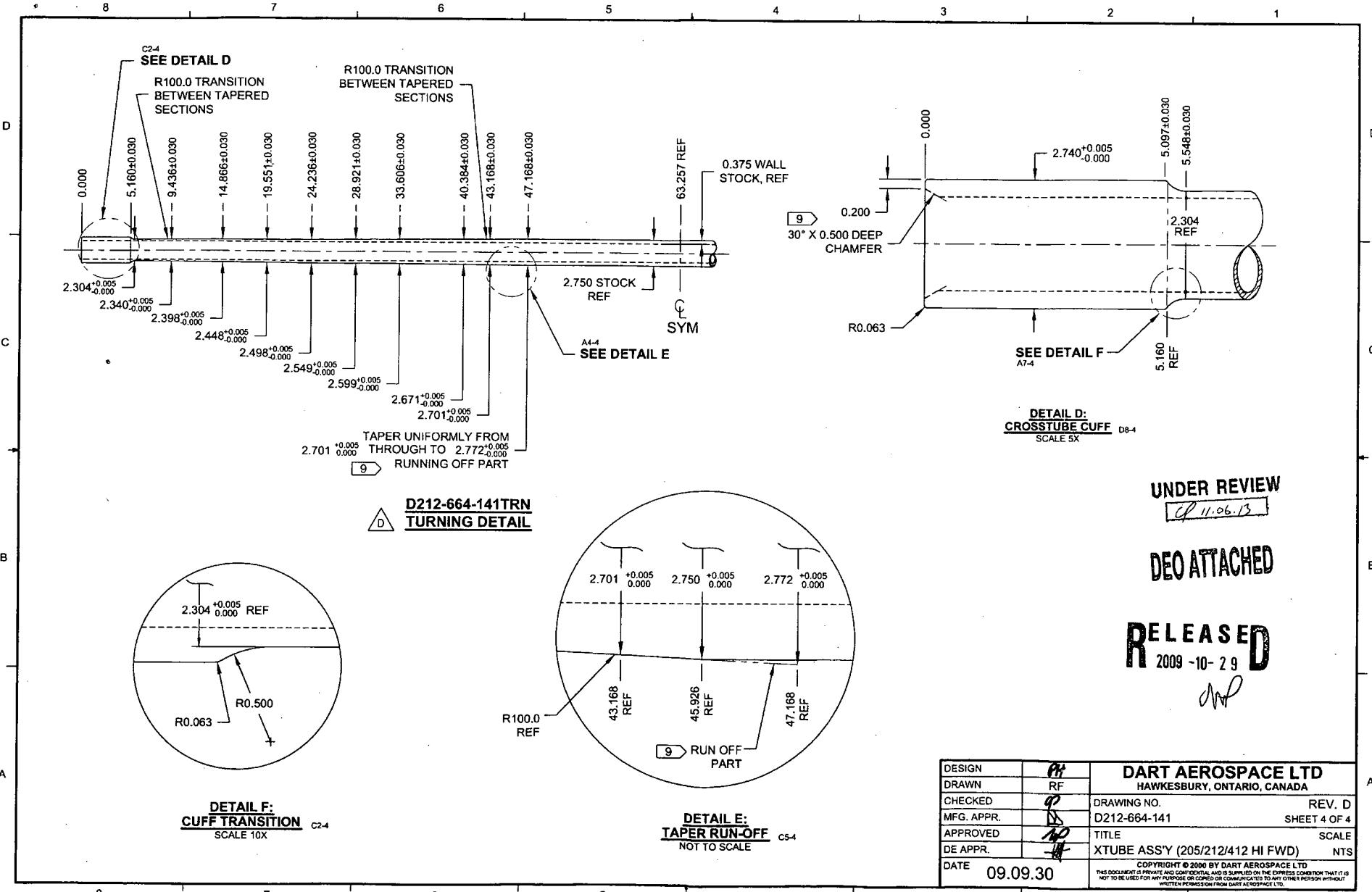
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

78023

DRAWING NO.	TITLE	REV. D	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO.	SHEET NO.	SCALE
D212-664-141	XTUBE ASSY (205/212/412 HI FWD)			D212-664-141-D-1	SHEET 1 OF 2	NTS
DRAWN	CHECKED	AP	MFG. APPR. ER	APPROVED NA	DE APPR. MM	NTS
DATE	DATE	11.04.11	DATE	11.04.12	DATE	11.04.12

PURPOSE:

ADD AN INSPECTION WINDOW TO UNDERSIDE OF CROSSTUBE.

RELEASED
2011-04-18
[Signature]

CHANGE:

NOTES 2 OF SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND
 PAINT OUTSIDE PER DART QSI 005 4.2
 REMOVE MASKING AND APPLY CLEAR COAT

WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2

UNDER REVIEW
 19/06/13
 DCV 11-614
 11.07.28
[Signature]

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

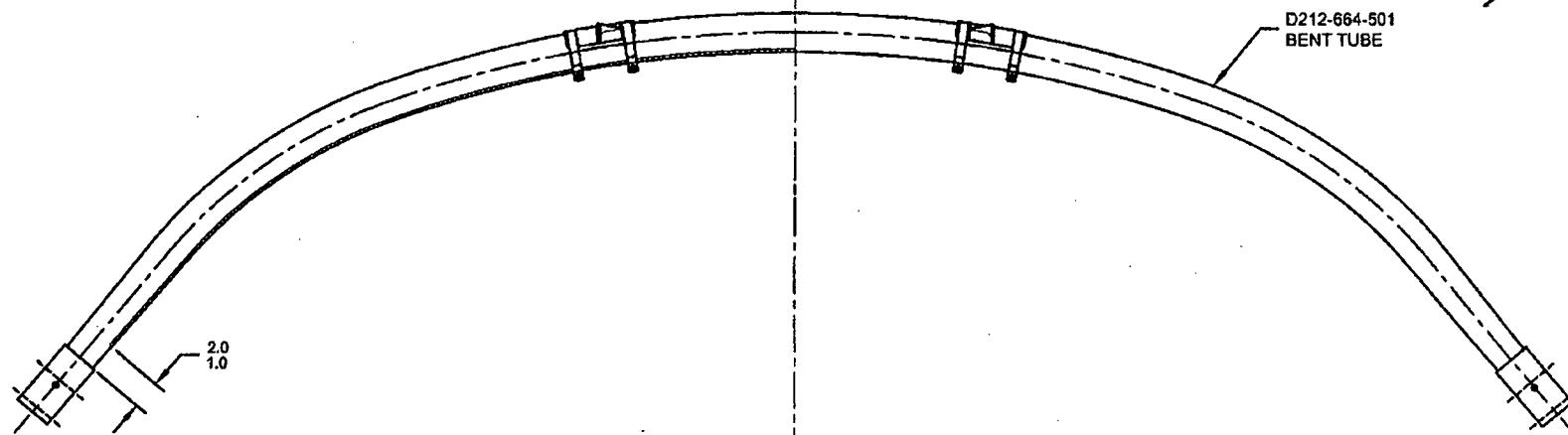
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

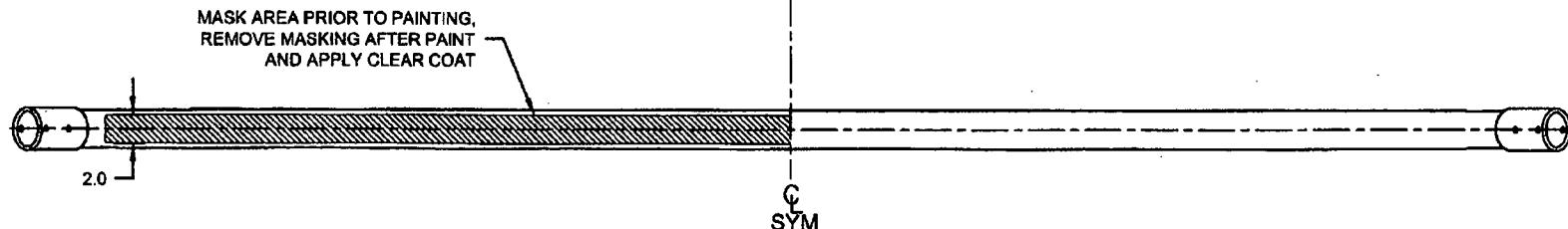
NOTE: Date & initial all entries

78023

DRAWING NO. D212-664-141	TITLE XTUBE ASSY (205/212/412 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D212-664-141-D-1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN DATE 11.04.07	CHECKED DATE 11.04.11		MFG. APPR. <i>(P)</i> DATE 11.04.12	APPROVED <i>(WAD)</i> DATE 11/04/12	DE APPR. <i>(WAD)</i> DATE 11.04.12	

~~UNDER REVIEW~~*(P) 11/06/13**ECM#11-614**11.07.28*IS:WAS:

D212-664-141/-141B
ASSEMBLY DETAIL



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

78023

DRAWING NO. D212-664-141	TITLE CROSSTUBE ASS'Y (205 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D212-664-141-D-2	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>IP</i>	CHECKED <i>A>S</i>		MFG. APPR. <i>AS</i>	APPROVED <i>MD</i>	DE APPR. <i>MM</i>	
DATE 11.07.15	DATE 11.07.20		DATE 11.07.21	DATE 11/07/21	DATE 11.07.21	

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

Item	Qty -141	Qty -141B	Part Number	Description
7	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
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NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2893-1 SUPPORT; ABRADE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



ACUREN

Daily Time Report

E-44217

Form dated Sep 2005

Client: Dart Aerospace
Contact: CHARTER
Location: 1220 BELVEDERE HIGHWAY
Description: Call for details on flights & rates
Report #'s: As Follows

Job #: _____
Day: Sun Mon Tues
P.O. #: _____
Vehicle # 678

Date: Dec 29 - 2017
Wed Thurs Fri Sat
W.O #: Camera #:

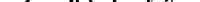
RADIOGRAPHIC UNIT PRICING

RADIOGRAPHIC UNIT PRICING															
Weld Diameter									Long Seam				Circ. Seam		
Schedule / Thickness									Thickness				Thickness		
Quantity									Lineal Ft.				Lineal Ft.		

Film: _____ Pcs. $2\frac{3}{4} \times 17"$
_____ Pcs. $3\frac{1}{2} \times 17"$
_____ Pcs. $4\frac{1}{2} \times 17"$
_____ Pcs. $14" \times 17"$
_____ Pcs.

Consumables: _____

Equipment:

Client Representative:  Michael J. Morris

Place a check mark in each safety check area as completed	
C/C	CAMERA CHECK
S/E	SAFETY EQUIPMENT CHECK
S/C	SURVEY METER CHECK
B/S	BARRIER & SIGN INSTALLED
C/L	CAMERA LOCKED & SECURELY STORED
C/S	CAMERA SURVEYED AFTER EACH USE

EXPENSES

NOTES 5 close to BES
W.C.'s, 77536, 77535, 77748
77128, 77103
W.C. 77128
77103

Oakville	(905) 825-8595 • Fax (905) 825-8598
Sarnia	(519) 336-3021 • Fax: (519) 336-8220
Sudbury	(705) 522-1849 • Fax (705) 522-9926
Halifax	(902) 497-3870 • Fax (902) 445-5090
North Bay	(705) 840-8107 • Fax (705) 476-6683
Val D'Or	(819) 856-6789 • Fax (819) 825-9564

ACUREN 1-877-299-2857

Cambridge	(519) 622-3112 • Fax (519) 622-1326
Cornwall	(613) 931-1261 • Fax (613) 931-2777
Saint John	(506) 847-0194 • Fax (506) 847-0194
Thunder Bay	(807) 475-4240 • Fax (807) 577-2017
Gaspé	(418) 392-3618 • Fax (418) 392-4114
Hull	(819) 360-0685 • Fax (819) 827-3513



LIQUID PENETRANT TEST REPORT

P- 12248

CLIENT	<u>Dort Aerospace</u>	DATE	<u>Dec 29-2011</u>	TIME	<u>AM</u>	PAGE <u>/</u> OF <u>/</u>
ATTENTION	<u>CHANZI</u>	ACUREN JOB NO.	<u>188-11-1</u>			
ADDRESS	<u>1270 A BLD DEK</u>	PO/WO NO.	<u>-</u>			
PROJECT	<u>HAWKERBURY, ON</u>	WORK LOCATION	<u>SURE</u>			
ITEM(S) EXAMINED	<u>ELI uni. 3 ENGINE MOUNTS</u>	ACCEPTANCE STD.	<u>ASME Y14.17/CS-238</u> REV./DATE <u>2005</u>			

JOB DESCRIPTION	PROCEDURE NO. LT- <u>Att 2</u> REV./DATE <u>2008</u>	TECHNIQUE NO. LT- <u>Att 2</u> REV./DATE <u>2008</u>
PART NO.	<u>SEE RESULTS</u>	MATERIAL <u>Aludine Aluminum</u> THICKNESS <u>Various</u>
SCOPE <u>A WET FLUORESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE</u>		

TEST DETAILS						
METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED	
FAMILY BRAND	<u>MAGNA Flux</u>					
PENETRANT	<u>ZL607</u>	MINIMUM DWELL TIME <u>45 10</u> MIN.	BLACK LIGHT S/N <u>16459</u>	<input type="checkbox"/> OUTPUT > 1000 $\mu\text{W}/\text{cm}^2$	<input type="checkbox"/> AMBIENT < 2 fc	
PENETRANT REMOVER	<u>K20</u>	MINIMUM DRY TIME <u>>10</u> MIN.	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE		
DEVELOPER	<u>SKD 52</u>	MINIMUM DWELL TIME <u>10</u> MIN.	OTHER <u>643m0</u>	LIGHT METER S/N <u>10988866</u> CAL DUE DATE <u>FEB 02 2012</u>		
DEVELOPER TYPE	<input type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY			

TEST SURFACE						
SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input type="checkbox"/> CLEAN BARE METAL	
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F			
RESULTS-	<input type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL					

<u>1 CROSS TUBE W.O. 77536 ✓</u> <u>1 CROSS TUBE W.O. 77535 ✓</u> <u>1 CROSS TUBE W.O. 77748 ✓</u> <u>1 ENGINE MOUNT W.O. 77128 ✓</u> <u>2 ENGINE MOUNT W.O. 77103 ✓</u> <u>1 Cross tube W.O. 78023 ✓</u> <u>1 Cross tube W.O. 78024 ✓</u>		<u>WELD REGLAND X (2)</u> <u>July 21/12</u>	
--	--	--	--

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE	<u>Andrew Sheldon</u> PRINT	<u>Abellor</u> SIGNATURE	DTR # <u>E044-217</u>
TECHNICIAN (SIGNATURE):	<u>John Harrison</u>		
NAME (PRINT):	<u>John Harrison</u>	1 ST TECHNICIAN	REPORT REVIEWED BY:
CGSB LEVEL	<u>SNT LEVEL</u>	2 ND TECHNICIAN	NAME <u></u> INITIALS <u></u>
CGSB REG. NO.	<u>6006</u>	CGSB LEVEL	SNT LEVEL
CGSB REG. NO.	<u>6006</u>	CGSB REG. NO.	

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY